THE IMMEDIATE EFFECT OF DIFFERENT MANDIBULAR POSITIONS ON MUSCLE FORCE IN THE UPPER AND LOWER LIMBS. A PILOT STUDY IN ASYMPTOMATIC SUBJECTS

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Introduction

It has been suggested that the use of occlusal splints to effect the mandibular position can improve sports performance in professional athletes. However, the scarce research in this area demonstrates conflicting evidence. This pilot study evaluates upper and lower limbs muscle force under three different mandibular positions in asymptomatic subjects.

Methods

Twenty one healthy subjects (13 males – 9 females) aged 18- 24 years were recruited among students physiotherapy based on strict inclusion/exclusion criteria . They all underwent a dental and orthopaedic screening examination. Included subjects were free of temporomandibular, oral or musculoskeletal disorders. In subjects who met the inclusion criteria, a hard wax bite of 2-4 mm in central relation was individually made to be used in this study. Grip strength was measured by maximal isometric contractions using the Jamar dynamometer. Isometric muscle force of the
quadriceps at 60° was measured using a Biodex dynamometer. Eccentric muscle force was measured in shoulder abduction muscles using the break method with also using a dynamometer (MicroFet). Three trials were done in each of 3 mandibular positions: 1) mouth closed without bite 2) mouth open and 3) mouth closed on a wax bite within each session, and in a random order. In 12 of the subjects the procedure was repeated after a period of a week. Using a linear mixed model approach covariance results were controlled for confounding of mandibular position, within-session trials and test day.

Results

No significant differences were found in muscle force between the three mandibular positions in any of the muscle groups tested ($p > 0.05$).

Discussion

The results of the present study indicate that in asymptomatic subjects, muscle force in the limbs was not influenced by altered mandibular position. This is in line with previously reported research (Williams et al, 1983, Schubert et al, 1984, Grosdent et al 2014) who failed to demonstrate improved strength as a result of wearing a balanced splint. The latter study, however, reported that artificial imbalanced occlusion could induce alteration of eccentric muscle performance.

References: Williams MO, Chaconas SJ, Bader P.(1983). J Prosthet Dent 49: 560-567. Schubert MM, Guttu RL, Hunter LH, Hall R, Thomas R. (1984). J Am Dent Assoc 108: 334-337. Grosdent S, O'Thanh R, Domken O, Lamy M, Croisier J-L. (2014). J Strenght Cond Res 28(2): 492-8.

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